# МИНОБРНАУКИ РОССИИ

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Кафедра иностранных языков


# Introduction to Scientific Writing


Методические указания
по иностранному (английскому) языку для самостоятельной
работы магистрантов и аспирантов всех направлений подготовки
очной и заочной форм обучения


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Introduction to Scientific Writing: методические указания по иностранному (английскому) языку для самостоятельной работы магистрантов и аспирантов всех направлений подготовки очной и заочной форм обучения / Юго-Зап. гос. ун-т; сост.: А.В. Анненкова, Р.В. Попадинец, А.В. Сороколетова – Курск, 2018. – 77 с.

Настоящие методические указания предназначены для магистрантов и аспирантов всех направлений подготовки и форм обучения для практики подготовки и овладения навыками и умениями написания научной работы на иностранном языке.

Целью методических указаний является совершенствование навыков и умений академической письменной речи студентов, оптимизация самостоятельной работы.

Методические указания соответствуют требованиям программ, магистратуры и аспирантуры очной и заочной форм обучения.

Текст печатается в авторской редакции

# Introduction

This course is designed for non-native speakers of English. It will provide a basic foundation for academic scientific writing. It incorporates the building blocks of good writing in English language scientific journals, especially those based in the United States. Module topics include using appropriate grammar, sentence structure, vocabulary, and avoiding plagiarism.

This course consists of four modules:
Module 1: Building a Foundation
Module 2: Combining Ideas
Module 3: Conveying Meaning
Module 4: Incorporating Sources

In each module you will do the following:
– Study a lesson.
– Take a practice quiz.
– Participate in a discussion.
– Take an exit quiz.

# Module 1. Building a Foundation

## Objectives for Module 1: Building a Foundation
− Analyze the essential components of a complete sentence.
− Distinguish complete sentences from sentence fragments and run-on sentences.
− Apply rules for adverb placement.
− Identify the common verb tenses used in scientific writing.

## Lesson 1: Sentence Structure and Adverb Placement

### Part 1: Basic Sentence/Finite Clause Structure
A **finite clause** is a structure that expresses a complete idea. It must contain a minimum of a **subject**, a **verb**, and any **complements** required by the verb. Look at sentence examples in the chart below:

| Adverb / Prepositional Phrase | Subject | Finite Verb | Other Verbs | Complements | Adverb / Prepositional Phrase |
|---|---|---|---|---|---|
| | The frequency | increased. | | | |
| | We | evaluated | | the data | from the experiment. |
| | The Congo River | supplies | | a large amount of organic matter | to the ocean. |
| In practice, | most users | were able | to use | the system | effectively. |
| For rabies, | vaccine availability | requires | | work. | |
| | The transmission of disease | is | | highly possible | in public places. |
| In designing our lesson, | we | tried | to create | typographical errors. | |
| Finally, at the | the | asked | | if they noticed | |

| end of the experiment, | researchers | | | any errors. | |
|---|---|---|---|---|---|

1. A subject can be one word or many words. The words in bold are the subjects in these example sentences:

**We** evaluated the data from the experiment.

**The transmission of disease** is highly possible.

**A mobile-phone-based system** was developed.

2. Similarly, a verb can be one word or many words. The words in bold are the verbs in these example sentences:

The frequency **increased** over time.

Most users **were able to use** the system effectively.

3. A subject does not always begin a sentence. The words in bold are the subjects in these example sentences:

In practice, **most users** were able to use the system effectively.

For rabies, **vaccine availability** still requires work.

4. Some sentences are complete with only a subject and verb. Other sentences require a complement.

The researchers published **their findings**.

The biologist collected **the samples**.

The doctor discovered **the cause of the disease.**

5. In addition to subject, verb, and a complement if required, there are also optional sentence components. The sentence is considered complete with or without those components. The optional sentence components are often prepositional phrases or adverbs or adverb phrases which indicate the time, place, or location of the action.

**Last year**, they published the research. (optional phrase indicates when)

**Recently**, they published the research. (optional word indicates when)

**In 2015**, they published the research. (prepositional phrase indicates when)

They published the research **in the *Journal of the American Medical Association***. (prepositional phrase indicates where)

They published the research **after they completed the study**. (adverb clause indicates when)

## Part 2: Complete Sentences

A **complete sentence** must contain a **subject** and a **verb**. Some sentences require a **complement**. Sentences that do not contain all of the required parts are called **sentence fragments**. Two sentences that are connected by no punctuation are called **run-on sentences**. Look at some examples:

Examples of complete sentences

In the current study, we observed a three-way interaction by the subjects.

The effect of the virus appears to be more than double the effect of the bacteria.

They also add to the growing literature on the relationship between personality and language.

Examples of sentence fragments

The relationship of personality traits and assessments of written errors. (subject only)

Was unexpected and difficult to interpret. (verb only, no subject)

Has been found. (verb only, no subject.)

People with lower agreeability ratings. (subject only, no verb)

He conducted. (no complement)

The researchers collected. (no complement)

Examples of run-on sentences

The researcher was pleased with the data it was robust.

We collected blood samples we analyzed the results.

This is an important finding more research needs to be done in this area.

Examples of run-on sentence corrections

This is an important finding. More research needs to be done. (with a period to make two sentences)

This is an important finding; more research needs to be done. (with a semicolon)

## Part 3: Adverb Placement

In English, **adverbs** appear at different locations in sentences, depending on function and meaning. Many of them appear in different locations than adverbs in other languages. Look at some examples and notice where the adverbs appear in each sentence (the words in bold are

the adverbs). What do you notice about similarities and differences between adverb placement in English and your own language?

1. Vaccine availability **still** requires work.

2. It has **already** been modified.

3. On first use, users took **approximately** ten minutes to complete the form.

4. Most users were able to use the system **effectively**.

5. These differences **definitely** reflect increased recording of dog bites.

6. Rabies is **primarily** spread by dogs.

7. The system is **currently** used by over 300 healthcare workers.

8. **Sometimes**, they go to Paris. **Sometimes**, we do not know where they go.

9. We need to do a **timely** evaluation of the program.

10. We **randomly** chose five participants.

11. A detailed study was **previously** published.

12. Seasonal rains **typically** peak between March and June.

13. User complaints are **generally** low.

14. **First**, we estimated the quantity.

15. **Second**, they completed a form.

16. **Finally**, at the end of the study, we asked five questions.

17. The data was **significantly** different.

18. Details are **extremely** scarce.

19. **Surprisingly**, the test had no errors.

20. **Similarly**, the subjects reported a reaction to heat.

Look at the chart below to see how adverbs can be classified according to meaning and how meaning affects adverb placement:

| Meaning | Examples | Placement | Example Sentences (words in bold are adverbs) |
|---|---|---|---|
| **frequency** | sometimes, occasionally, often, normally, usually, only, also, just, | 1. before main verb <br> 2. between first and second auxiliary <br> 3. after negative | 1. We **never** go. <br> 2. We **just** visited her. <br> 3. PEP has **already** been modified. <br> 4. We don't **often** go. |

| | | | |
|---|---|---|---|
| | already, still, generally | 4. after "be"<br>5. at beginning of sentence for emphasis or for sentence variety | 5. We have not **always** visited him.<br>6. Transmission is **generally** low.<br>7. **Normally**, we take a vacation in August.<br>8. **Usually,** he comes in at 3:00.<br>9. **Sometimes**, they go to Paris. |
| **probability** | certainly, probably, likely, definitely | 1. before main verb<br>2. before negative | 1. We **definitely** want to see her.<br>2. We **certainly** won't go.<br>3. He will **likely** come on time.<br>4. They will **probably** not visit him this time. |
| **manner** | quickly, slowly, considerably, completely, effectively | 1. can sometimes go before the verb but can always go after the phrase or at the end of sentence (so best to memorize and use that rule) | 1. We ate dinner **quickly**.<br>2. We **randomly** assigned five tasks.<br>3. This program will help medical workers **considerably**.<br>4. Most users were able to use the system **effectively**.<br>5. Rabies is **primarily** spread by dogs. OR Rabies is spread **primarily** by dogs. |

| time | immediately, once a week, every day, today, first, second, next | 1. at the end of phrase or sentence, particularly multi-word adverbs of time<br>2. at the beginning of sentence for emphasis or sentence variety | 1. We called him **immediately**.<br>2. We went there **every day**.<br>3. They monitored the site **once a week**.<br>4. **Today**, fewer rabies deaths occur than in previous decades. |
|---|---|---|---|

**Practice Quiz: Sentence Structure and Adverb Placement (Total – 15 points)**

*Subject/Verb/Complement Identification. Read the sentences and find the part of the sentence requested.*

*Question 1 (1 point)*

*The marine diversity of Gabon, West Africa, has not been well studied. What is the subject?*

**A** The marine diversity of Gabon, West Africa,

**B** The marine

**C** The marine diversity

*Question 2 (1 point)*

*The marine diversity of Gabon, West Africa, has not been well studied. What is the verb?*

**A** has not been well studied

**B** has

**C** has not been

*Question 3 (1 point)*

*On October 12, we observed the changes in temperature. What is the subject?*

**A** We

**B** On October 12

**C** the changes in temperature

*Question 4 (1 point)*

*On October 12, we observed the changes in temperature. What is the complement?*

**A** observed

**B** On October 12

**C** the changes in temperature

***Complete/Incomplete Sentence Discrimination** – Look at the groups of words given and decide if the words constitute a complete sentence, a sentence fragment, or a run-on sentence.*

***Question 5 (1 point)***

*Mobile phones are cheap and ubiquitous.*

**A** complete sentence

**B** run-on sentence

**C** sentence fragment

***Question 6 (1 point)***

*A fatal disease that kills thousands of people per year.*

**A** sentence fragment

**B** complete sentence

**C** run-on sentence

***Question 7 (1 point)***

*Defining institutional responsibilities for collecting and compiling surveillance information.*

**A** sentence fragment

**B** complete sentence

**C** run-on sentence

***Question 8 (1 point)***

*The researchers trained the participants in the study to use mobile phones the participants learned to use the devices quickly.*

**A** run-on sentence

**B** complete sentence

**C** sentence fragment

***Adverb Placement** – Look at the groups of sentences in each question and decide in which one the adverb is correctly placed.*

***Question 9 (2 points)***

*Read the sentences and click on the box next to each sentence in which the adverb appears in an acceptable location. (2 correct sentences)*

**A** The researchers randomly assigned numbers to the subjects.

**B** The researchers assigned randomly numbers to the subjects.

**C** The researchers assigned numbers to the subjects randomly.

*Question 10 (3 points)*

*Read the sentences and click on the box next to each sentence in which the adverb appears in an acceptable location. (3 correct sentences)*

    **A** Usually, the test results are sent to the lab.

    **B** The test results are usually sent to the lab.

    **C** The test results are sent usually to the lab.

    **D** The test results are not usually sent to the lab.

    **E** The test results are not sent usually to the lab.

*Question 11 (2 points)*

*Read the sentences and click on the box next to each sentence in which the adverb appears in an acceptable location. (2 correct sentences)*

    **A** I collected once a week samples from the lake.

    **B** I collected samples from the lake once a week.

    **C** Once a week, I collected samples from the lake.

**Discussion: Sentence Structure and Adverb Placement**

Find a research article from your field. Then find at least one example of a sentence with each type of adverb: time, probability, manner, and frequency. Explain your choice, translate the sentences.

**Lesson 2: Verb Tenses in Scientific Writing**

**Part 1: English Verb Tenses – Forms**

This table shows the forms of English tenses for a regular verb (explain) and an irregular verb (find) in the active (explain/find) and passive (was/were explained/found) voices.

| | **Simple** | **Perfect** | **Progressive** | **Perfect Progressive** |
|---|---|---|---|---|
| **Present Active** | he explains she finds | he has explained she has found | he is explaining she is finding | he has been explaining she has been finding |

| | | | | |
|---|---|---|---|---|
| **Present Passive** | it is explained<br>It is found | it has been explained<br>it has been found | it is being explained<br>it is being found | it has been being explained<br>it has been being found |
| **Past Active** | he explained<br>she found | he had explained<br>she had found | he was explaining<br>she was finding | he had been explaining<br>she had been explaining |
| **Past Passive** | it was explained<br>it was found | it had been explained<br>it had been found | it was being explained<br>it was being found | it had been being explained<br>it had been being found |

The tenses shown above account for the majority of the tensed verbs used in academic writing (Caplan, 2012). In fact, 98% of the verb tenses used in academic writing are in these three tenses: present simple (70%), past simple (23%), and present perfect (5%) (Biber et al., 1999, in Caplan, 2012, p. 66).

Additionally, verbs can occur in either **active** or **passive** voice. About 25% of verbs in academic and scientific writing are in the **passive voice** (Biber et al., 1999, in Caplan, 2012). The choice of whether to use **active** or **passive** depends on various factors. However, in general, when the agent (who or what does the action) is important, **active voice** is used. When the emphasis is on what was done or what occurred, **passive voice** is used. **Active** and **passive** are also used to increase sentence variety.

*Examples*

The National Science Foundation (NSF) conducted the study. (active)

The study was conducted last year. (passive)

In the above sentences, **passive** is used in the second sentence to avoid naming the agent again, which would be repetitive and unnecessary; the agent was already named in the first sentence. As you read articles in your field, note how often and for what purpose **active** and **passive** voice is used.

As you probably know, there are two types of verbs in English: **regular** and **irregular**. For **regular verbs**, both the past simple and present perfect are formed by adding "-ed" to the end of the main verb (help/helped, conduct/conducted). For **irregular verbs**, the past tense form does not add "–ed." Instead, the past simple and past participle are in a different form. The past participle is used for perfect tense forms and passive voice. Sometimes the past simple and past participle form of the verb are the same, but sometimes they are different. Look at some examples below:

| Present Simple | Past Simple | Past Participle | Passive |
|---|---|---|---|
| say | said | has/have said | was/were said |
| make | made | has/have made | was/were made |
| find | found | has/have found | was/were found |
| come | came | has/have come | NA<br>This verb does not occur in passive. |
| describe | described | has/have described | was/were described |
| include | included | has/have included | was/were included |
| show | showed | has/have shown | was/were shown |
| give | gave | has/have given | was/were given |
| see | say | has/have seen | was/were seen |
| feel | felt | has/have felt | was/were felt |
| seem | seemed | has/have seemed | NA<br>This verb does not occur in passive. |
| meet | met | has/have met | was/were met |
| tell | told | has/have told | was/were told |
| learn | learned | has/have learned | was/were learned |
| choose | chose | has/have chosen | was/were chosen |

| spend | spent | has/have spent | was/were spent |
|-------|-------|----------------|----------------|

Remember that the past participle is used for both the **present perfect** and **past perfect** (has found, had found), as well as the **passive** (was found, were found).

### Part 2: Verb Tense Use in Scientific Writing

Verb tense indicates the time an action occurs and gives information about the relationship of one event to another.

Did something happen before something else, after something else, or at the same time? How many verb tenses are there in English? There are thirteen verb tenses. However, only three tenses make up ninety-eight percent of tense use in scientific writing. Which three tenses do you think are most commonly used in scientific writing in English?

The three tenses used most often are first, **present simple**, which is used in seventy percent of sentences in scientific writing; second, **past simple**, which is used in twenty-three percent of the sentences; and third, **present perfect**, which is used in five percent of the sentences in scientific writing.

1. **Simple present tense** is used primarily for the following purposes in academic writing:

| Purpose | Examples |
|---------|----------|
| to frame the paper<br>The introduction is often in present simple tense. The present simple tense is used to describe what is already known about the topic. | 1. The prevalence of social media **means** that we often **find** written language with variation and errors.<br>2. In this paper, we **focus** specifically on actual written errors. |
| to make general statements, conclusions or interpretations about previous research or general knowledge | 1. Social media **includes** styles of writing that **differ** from standard usage.<br>2. Our examination of marine communities associated with oil platforms in Gabon **is** the first |

| | |
|---|---|
| | scientific investigation of these structures and **highlights** the unique ecosystems associated with them. 3. The marine diversity of Gabon **is** poorly **known**. |
| to introduce evidence or support with "there + be" | 1. **There are** no true coral reefs in Gabon. 2. **There are** currently 40 offshore oil platforms in Gabon. |

2. **Simple past tense** is used primarily for the following purposes in academic writing:

| Purpose | Examples |
|---|---|
| to introduce a specific study, usually completed by a named researcher | 1. Researchers at Ifakara Health Institute (IHI) **were alerted** to human rabies deaths and acute distress among families unable to obtain PEP. 2. Subsequent research **estimated** the burden of rabies in these communities. |
| to describe the methods and data of a completed experiment | 1. Participants **completed** a 10-item evaluation scale for each method. 2. We **conducted** underwater visual fish consensuses using two methods. 3. Benthic taxon and fish species diversity **were calculated** from the Shannon-Weaver diversity index. |
| to mark time with specific time markers such as **in 2010**, **after the study**, **at that time**, and **previously** | 1. **After 10 minutes of training**, most users **were able** to log on without problems. 2. **Finally**, participants **were asked** if they noticed any errors in the messages they read. 3. **On October 12, 2012**, we **observed** |

| | pair spawning of red snapper. |
|---|---|

3. **Simple present perfect tense** is used primarily for the following purposes in academic writing:

| Purpose | Examples |
|---|---|
| to introduce a new topic, sometimes using there has/have been | 1. There **have been** few studies of this issue **done**.<br>2. The marine life on these structures **has never been studied**. |
| to summarize previous research | 1. Previous research **has focused** on the deep sea biodiversity of the continental margin.<br>2. James Pennebaker and colleagues **have shown** a variety of correlations between personality traits and the use of words. |
| to describe previous findings or tell the history of an idea | 1. The marine biodiversity of Gabon **has not been well studied**.<br>2. Few studies concerning the interpretation of errors **have been done** to date.<br>3. A few studies **have shown** that individual differences in empathy influence some aspects of language interpretation. |
| to mark time with specific time markers such as **since 2009**, **never**, **to date**, and **until now** | 1. **Since 2010**, we **have registered** over 450 users.<br>2. Forty thousand oil wells **have been drilled** in the Gulf of Mexico **since the 1940s**.<br>3. The marine life on these structures **has never been studied**. |

**Practice Quiz: Verb Tenses in Scientific Writing (Total – 18 points)**

*Verb Tenses: Past Simple – Type the past simple tense of the verb in the blank.*

***Question 1 (1 point)***
What is the past simple form of "find"?

***Question 2 (1 point)***
What is the past simple form of "conclude"?

***Question 3 (1 point)***
What is the past simple form of "give"?

***Question 4 (1 point)***
What is the past simple form of "take"?

*Verb Tenses: Past Participle – Type the past participle form of the verb in the blank.*

***Question 5 (1 point)***
What is the past participle form of "be"?

***Question 6 (1 point)***
What is the past participle form of "take"?

***Question 7 (1 point)***
What is the past participle form of "see"?

***Question 8 (1 point)***
What is the past participle form of "write"?

***Question 9 (1 point)***
What is the past participle form of "try"?

*Verb Tense Use – Read the sentences and decide which verb tense is best used to complete the sentence correctly.*

***Question 10 (1 point)***
Offshore oil and gas exploration _____ in 1960 in Gabon. (begin)
**A** begin
**B** began
**C** has begun

***Question 11 (1 point)***
Approximately 40,000 oil and gas wells _____ in the Gulf of Mexico since the 1940s. (drill)
**A** are drilled
**B** were drilled

**C** have drilled
**D** have been drilled
***Question 12 (1 point)***
In this paper, we _____ the relationship between personality type and rating of errors in email communication. (describe)
**A** describe
**B** described
**C** have described
***Question 13 (1 point)***
There _____ many types of flu viruses. (be)
**A** are
**B** were
**C** have been
***Question 14 (1 point)***
Johnson and Graves _____ that three main viruses are responsible for over half of the flu outbreaks in their 2014 study. (find)
**A** find
**B** found
**C** were found
***Uses of Tenses****: Identify which tense is commonly used for the purpose described.*
***Question 15 (1 point)***
To frame the paper and describe what is known about the topic
**A** present simple
**B** past simple
**C** present perfect
***Question 16 (1 point)***
To describe the methods of data collection
**A** present simple
**B** past simple
**C** present perfect
***Question 17 (1 point)***
To summarize previous research
**A** present simple
**B** past simple
**C** present perfect
***Question 18 (1 point)***

To make statements about known facts and general knowledge
**A** present simple
**B** past simple
**C** present perfect

**Discussion: Verb Tenses in Scientific Writing**
Find an article from your field. Find the following:
– Two examples of sentences in the present simple. Identify why present simple tense was used and label the sentences.
– Two examples of sentences in the past simple. Identify why past simple tense was used and label the sentences.
– Two examples of sentences in the present perfect. Identify why present simple tense was used and label the sentences.
– One example each of passive voice in present simple, past simple, and present perfect.
Explain your choice, translate the sentences. Share them with other participants. List the name and author of the article from which you got the sentences and if possible a link to the article.

**Module 1: Exit Quiz (Total – 19 points)**
*Subject/Verb/Complement Identification – Read the sentences and identify the part requested.*
*Question 1 (1 point)*
Offshore oil and gas platforms are among the largest artificial structures in the ocean. What is the subject?
**A** Offshore oil
**B** Offshore oil and gas
**C** Off shore oil and gas platforms
*Question 2 (1 point)*
Offshore oil and gas platforms are among the largest artificial structures in the ocean. What is the verb?
**A** are
**B** are among
**C** platforms are
*Question 3 (1 point)*
The researchers have not yet published the complete results of the study. What is the complement?

**A** not yet published
**B** published the complete results
**C** the complete results of the study

***Complete/Incomplete Sentence Identification** – Read the sentences and decide if they are complete sentences, sentence fragments, or run-on sentences.*

**Question 4 (1 point)**
Surveillance is critical to control infectious diseases.
**A** complete sentence
**B** sentence fragment
**C** run-on sentence

**Question 5 (1 point)**
Since establishing the system in 2010.
**A** complete sentence
**B** sentence fragment
**C** run-on sentence

**Question 6 (1 point)**
Forms included an option for users to send feedback users were trained to use the equipment.
**A** complete sentence
**B** sentence fragment
**C** run-on sentence

**Question 7 (1 point)**
Most health facilities in Tanzania had no Internet access and unreliable power.
**A** complete sentence
**B** sentence fragment
**C** run-on sentence

***Adverb Placement** – Read the sentences and click the box next to the sentences in which the adverb is correctly placed.*

**Question 8 (4 points)**
Read the sentences and click on the box next to each sentence in which the adverb appears in an acceptable location. (5 correct sentences)
**A** He saw definitely the meteor.
**B** They randomly assigned numbers to the test subjects.
**C** The new findings will help people of that region considerably.

**D** We check every day the water levels of the lake.
**E** We definitely wish to conduct the experiment again.
**F** He does not go often on the excursions.
**G** The distance had already been calculated by the researchers
**H** Suddenly, the chemicals began to bubble in the test tube.
***Verb Tenses** – Choose the verb tense that best completes the sentence.*
***Question 9 (1 point)***
Since 2010, we _____ over 450 users. (register)
**A** have registered
**B** register
**C** registered
***Question 10 (1 point)***
In 2012, the researchers _____ a study with over 2,000 participants. (conduct)
**A** conducted
**B** have conducted
**C** conduct
***Question 11 (1 point)***
The use of social media _____ very popular among young people today. (be)
**A** is
**B** was
**C** has been
***Question 12 (1 point)***
There _____ currently 3,600 gas and oil platforms in the Gulf of Mexico. (be)
**A** are
**B** is
**C** have been
**D** were
*Read the purpose given and decide which tense is commonly used for that purpose in scientific writing.*
***Question 13 (1 point)***
To describe previous findings or describe the history of an idea
**A** present simple
**B** past simple

**C** present perfect
*Question 14 (1 point)*
To frame the paper
**A** present simple
**B** past simple
**C** past perfect
*Question 15 (1 point)*
To describe the methods and data of a completed experiment
**A** present simple
**B** past simple
**C** present perfect

**Module 1: Discussion**

Write 7-10 sentences about your job and research. Be aware of sentence structure and verb tense as you write. Also, try to incorporate as many adverbs as possible where appropriate. You might answer questions such as 1) What is your job? 2) What is the nature of your research? 3) What do you do on a regular, occasional, and infrequent basis in either your job or your research? 4) What research have you conducted in the past?

Read and respond to at least two other cparticipants' descriptions. How are you and your interests similar to or different from the participant whose description you read? Discuss.

## Module 2: Learning Objectives and Activities

**Objectives for Module 2: Connecting Ideas**
– Recognize and use a variety of coordinating conjunctions, subordinating conjunctions, sentence connectors, and relative pronouns commonly used in scientific writing.
– Share compound and complex sentences using correct grammar and punctuation in a scientific writing context.
– Identify strategies for organizing sentences within paragraphs in scientific writing.
– Create cohesion between sentences within a paragraph.

### Lesson 1: Connecting Sentences
Scientific writing in English requires you to use a variety of sentence types and lengths. Sometimes you want to write a very short and simple sentence to bring extra clarity or emphasis to an idea. Other times you want to include several ideas in a sentence to show multiple connections or relationships between ideas. In other words, you need to use all kinds of sentences – short and long, simple and complex – to write about your scientific research. This requires you to be able to write sentences with more than one clause. Correct punctuation varies depending on the type of word or phrase used.

### Clauses
A **clause** is a group of words connected by a verb. There are two types of clauses: **independent** and **dependent**. An **independent clause** is a complete sentence because it has a subject with a finite verb that can carry verb tense. A **dependent clause** is not a complete sentence and often begins with a **subordinating conjunction** such as "because" or "if."

### Part 1: Using Subordinating Conjunctions to Combine Clauses
**Subordinating conjunctions** include the following words and phrases commonly found in scientific writing: because, if, although, while, unless, after, before, as, whereas, since, despite the fact, when, whether, in order that, once, so that, even though.
The subordinating conjunction begins the dependent clause and indicates its relation to the rest of the sentence. An example is "although

the advantages were evident," which is not a complete sentence. It needs to be combined with an independent clause to create a grammatically complete sentence.

Sometimes the dependent clause comes before the independent clause:

**Although** the advantages were evident, the director decided not to follow the plan.

Other times the dependent clause comes after the independent clause:

The director decided not to follow the plan **although** the advantages were evident.

---

**Punctuation Guidelines:**

Place a comma immediately after the dependent clause when it comes before the independent clause (see sentences above). Commas are not commonly used between the two clauses when the independent clause comes first – unless a strong contrast is expressed with "whereas" or "while" as in the examples below:

Spiny lobsters were found in groups of 2–4 individuals and were of small size (10–15 cm total body length), **while** slipper lobsters were often found alone or in pairs and attained larger adult sizes (20–25 cm total length).*

The former were dominated by a solitary cup coral, Tubastraea sp., **whereas** the latter were dominated by the barnacle Megabalanus tintinnabulum.*

---

### Part 2: Using Coordinating Conjunctions to Combine Clauses

Two independent clauses are often connected with a **coordinating conjunction** such as and, but, so, or, yet, nor, for. To help us remember which words fall into this category, we sometimes refer to them by using the acronym "fanboys" (**f**or, **a**nd, **n**or, **b**ut, **o**r, **y**et, **s**o). The following examples use coordinating conjunctions:

There are no true coral reefs in Gabon, **and** most of the largely unmapped reefs are rocky.*

Extensive oil exploration and development began onshore in Gabon in the 1950s, **but** offshore exploration did not begin until the 1960s.*

Large snappers (primarily L. dentatus) were often deeper and not easily observed, **so** the actual standing stock of fish biomass on these platforms is likely much higher than our estimates suggest.*

---

**Punctuation Guidelines:**
When connecting two independent clauses with a coordinating conjunction, place a comma before the conjunction.

---

## Part 3: Using Sentence Connectors to Combine Clauses

Another way to connect independent clauses is with **sentence connectors**, which are sometimes called transitional adverbs. These include the following words and phrases: therefore, however, in addition, nevertheless, in contrast, for example, in other words, moreover, consequently, for instance, as a result, thus. These draw more attention to themselves than do the subordinating conjunctions and coordinating conjunctions introduced above. Their size and punctuation tend to "stop" the readers and make them think about the relationship. Therefore, you want to use them sparingly.

---

**Punctuation Guidelines:**
Place a semi-colon between the two clauses. If the sentence connector comes at the beginning of the second clause, a comma usually follows it. If the sentence connector is not the first word in the clause, it will be preceded and followed by a comma. Note: the semi-colon can be replaced with a period. The following are examples:

Most of the fish biomass on the platforms was composed of pelagic species with broad biogeographic distributions. **However,** much of the observed species richness consisted of demersal species, many of which had distinct and unique assemblages.*

The authors used the punctuation above, but they also had the options below:

Most of the fish biomass on the platforms was composed of pelagic species with broad biogeographic distributions**; however,** much of the observed species richness consisted of demersal species, many of which had distinct and unique assemblages.

Most of the fish biomass on the platforms was composed of

pelagic species with broad biogeographic distributions. Much of the observed species richness**, however,** consisted of demersal species, many of which had distinct and unique assemblages.

**Useful Subordinating Conjunctions, Coordinating Conjunctions, and Sentence Connectors** (adapted from Oshima & Hogue, 2006)

| Meaning/Function | Subordinating Conjunctions | Coordinating Conjunctions | Sentence Connectors |
|---|---|---|---|
| to introduce an additional idea | | and | in addition<br>furthermore<br>moreover |
| to introduce an opposite idea or contrast | although<br>though<br>even though<br>whereas<br>while | but<br>yet | in contrast<br>however<br>nevertheless<br>instead |
| to show similarity | | | likewise<br>similarly |
| to introduce an example | | | for example<br>for instance |
| to introduce a result | | so | as a result<br>therefore<br>consequently<br>thus |
| to introduce a cause | | for | |
| to introduce a choice or alternative | if<br>unless | or | otherwise<br>alternatively |
| to introduce a restatement or explanation | | | in fact<br>indeed<br>that is |
| to introduce order | before | | first |

| (time) | after<br>until<br>when<br>while<br>as soon as<br>since | | second<br>next<br>after that<br>meanwhile<br>subsequently<br>finally |
|---|---|---|---|
| to introduce a summary or conclusion | | | clearly<br>in brief<br>in conclusion<br>indeed<br>in short<br>in summary |

## Part 4: Using Relative Clauses

Another way to combine ideas (and clauses) in your sentences is through **relative clauses**. These are the parts of sentences that begin with a **relative pronoun** such as "who" or "which" (although in some cases it is possible to delete these words, leaving only a reduced version of the clause). Relative clauses are an excellent way to combine ideas or add information to a sentence in your scientific writing. There are two types of relative clauses – **non-restrictive** and **restrictive** – which vary in meaning and punctuation.

### Non-Restrictive Relative Clauses

A **non-restrictive relative clause** adds extra information to a noun in the main clause for the purpose of clarifying, describing, or explaining it. Use the relative pronoun "who" (or "whom" when in object position) to refer to humans; use "which" for non-humans; and use "whose" for all possessive forms. The following are examples of sentences with non-restrictive relative clauses:

These platforms are in sharp contrast to much of Gabon's marine environment, **which** is dominated by soft sediment communities.*

Longitude and depth, **which** were significantly correlated with latitude and platform area respectively (p<0.05), also were excluded from the analysis.*

Several amphi-atlantic species, **which** occur only around oceanic islands, were observed on the oil platforms off Gabon.*

Alternatively, a non-restrictive relative clause can serve to extend the meaning of the main clause (especially when placed at the end of the sentence) by adding a result or implication.

The addition of artificial reefs in the deep sea is likely to increase ecological connectivity, **which** will have important biogeographical consequences.*

---

**Punctuation Guidelines**:
Place a comma before the restrictive relative clause. If the restrictive relative clause comes in the middle of the sentence, also place a comma after the relative clause.

---

### Restrictive Relative Clauses

The **restrictive relative clause** actually identifies the subject rather than simply provide extra information about it. Use the relative pronouns "who" or "that" (or "whom" when in object position) to refer to humans; use "which" or "that" for non-humans; and use "whose" for all possessive forms. The following is an example of a sentence with a restrictive relative clause:

Rigs-to-reef programs **which** allow decommissioned oil platforms to stay in place have gained some support by governmental and non-governmental organizations.*

Note: The authors could have replaced "which" with "that" in this sentence.

---

**Punctuation Guidelines**:
No commas are used.

---

### Differences in Meaning

Non-restrictive and restrictive relative clauses appear almost identical (except for the use of commas), but the meaning can be quite different.

**Non-restrictive relative clause**: Survey questions**, which** focused on attitudes toward exercise**,** were open ended. (Meaning: All of the survey questions on this survey were focused on attitudes toward exercise.)

**Restrictive relative clause**: Survey questions **which** focused on attitudes toward exercise were open ended. Survey questions **which** focused on medical history were multiple choice. (Meaning: There are different kinds of survey questions. Those focusing on attitudes toward exercise were all open ended format. Multiple choice format was used for another topic.)

**Non-restrictive relative clause**: The surveys**, which** were conducted via email**,** consisted of 20 questions. (Meaning: All of the surveys consisted of 20 questions.)

**Restrictive relative clause**: The surveys **which** were conducted via email consisted of 20 questions. The surveys **which** were conducted in the office consisted of 25 questions. (Meaning: There were two different surveys, and they are identified by the place in which they were conducted.)

**Using Reduced Forms of Relative Clauses**

It is possible to reduce relative clauses to make your writing more concise. However, do not do this if it will create ambiguity or other possible confusions for the reader.

**Reducing a non-restrictive relative clause**

When the clause comes at the end of a sentence, the relative pronoun (which or who) can be deleted and the verb changed to an "-ing" form.

Original Form: Two similar medications were distributed**, which** caused confusion among the patients.

Reduced Form: Two similar medications were distributed**, causing** confusion among the patients.

If the verb is a form of "be", delete both the relative pronoun (which or who) and the verb.

Original: The first treatment, **which was** a series of five exercises, was introduced during the first week.

Reduced Form: The first treatment, a series of five exercises, was introduced during the first week.

**Reducing a restrictive relative clause**

Delete the relative pronoun (which, who, that) and change the verb to an "-ing" form.

Original Form: Survey questions **which focused** on attitudes toward exercise were open ended.

Reduced Form: Survey questions **focusing** on attitudes toward exercise were open ended.

If there is a "be" verb, delete both the relative pronoun (which, who, that) and the "be" verb.

Original Form: Surveys **that were completed** before the final treatment were discarded.

Reduced Form: Surveys **completed** before the final treatment were discarded.

*Friedlander, A. M., Ballesteros, E., Fay, M. & Sala, E. (2014). Marine communities on oil platforms in Gabon, West Africa: High biodiversity oases in a low biodiversity environment. *PLoS One 9*(8), 1-15. http://dx.doi.org/10.1371/journal.pone.0103709

**Practice Quiz: Connecting Sentences (Total – 12 points)**

The exercises here use examples from the following article: Ahonkhai, V., Martins, S.F., Portet, A., Lumpkin, M., & Hartman, D. (2016). Speeding access to vaccines and medicines in low- and middle-income countries: A case for change and a framework for optimized product market authorization. *PLoS One 11*(11)*, 1-12.* http://dx.doi.org/10.1371/journal.pone.0166515

*Question 1 (3 points)*

Can you distinguish dependent clauses from independent clauses? Analyze the following sentences (and parts of sentences), ignoring puncuation. Put a check next to items that are independent clauses. There are three. Find and check all of them.

**A** no human or animal research was involved in our study

**B** before they can be registered for sale

**C** eliminating mandatory laboratory testing of samples or GMP inspections

**D** because the current study includes participant variables that were not included in prior models

**E** regulatory agencies have an obligation to insist on critical international standards

**F** although exhaustive data existed for the WHO PQ program timelines for all prequalified products

**G** we contracted a management consulting firm

*Question 2 (1 point)*

Which sentence connector best fills the blank in the sentence below? Note: There may be more than one possibility.

Our intuition was that the resultant drug lag should be addressed in order to improve health for millions in underserved nations. _____, we worked with several partners to investigate

timelines for the global registration process for both vaccines and medicines intended to prevent or treat communicable diseases.

    **A** In addition
    **B** However
    **C** Furthermore
    **D** For instance
    **E** Instead
    **F** First
    **G** For example
    **H** Therefore
    **I** In contrast

*Question 3 (1 point)*

Which sentence connector best fills the blank in the sentence below? Note: There may be more than one possibility.

For our data collection and stakeholder interviews we contracted a management consulting firm; _____, the data interpretation and conclusions were our responsibility.

    **A** in addition
    **B** however
    **C** furthermore
    **D** for instance
    **E** instead
    **F** first
    **G** for example
    **H** therefore
    **I** in contrast

*Question 4 (1 point)*

Which sentence connector best fills the blank in the sentence below? Note: There may be more than one possibility.

SRA-approved vaccines took a median of 16 months to complete the WHO PQ process. _____, the PQ time for drugs that have been SRA approved was four months because the medicines PQ team did not repeat many of the regulatory activities already performed by SRAs.

    **A** In addition
    **B** However
    **C** Furthermore

**D** For instance

**E** Instead

**F** First

**G** For example

**H** Therefore

**I** In contrast

*Question 5 (1 point)*

Which sentence connector best fills the blank in the sentence below? Note: There may be more than one possibility.

We identified several potential root causes of this time spread. _____, as mentioned earlier, large multi-national manufacturers typically did not prioritize early registration and introduction of their novel products into low-income countries.

**A** In addition

**B** However

**C** Furthermore

**D** For instance

**I** Instead

**F** First

**G** For example

**H** Therefore

**I** In contrast

*Question 6 (1 point)*

Which sentence connector best fills the blank in the sentence below? Note: There may be more than one possibility.

Implementation of the changes proposed here will primarily benefit products that participate in PQ. _____, developing efficient, non-redundant, and optimized regulatory systems will benefit all biopharmaceutical products marketed in low- and middle-income countries.

**A** In addition (this is the sentence connector used in the article)

**B** However

**C** Furthermore

**D** For instance

**E** Instead

**F** First

**G** For example

**H** Therefore

**I** In contrast

***Question 7 (1 point)***

Which sentence contains the correct relative clause?

**A** The introduction of these health interventions in low- and middle-income countries continues to face a time lag due to factors they remain poorly understood.

**B** The introduction of these health interventions in low- and middle-income countries continues to face a time lag due to factors who remain poorly understood.

**C** The introduction of these health interventions in low- and middle-income countries continues to face a time lag due to factors which remain poorly understood.

**D** The introduction of these health interventions in low- and middle-income countries continues to face a time lag due to factors remain poorly understood.

***Question 8 (1 point)***

Which sentence contains the correct relative clause?

**A** We worked with a broad set of stakeholders, which including the World Health Organization's prequalification team, national regulatory authorities, manufacturers, procurers, and other experts.

**B** We worked with a broad set of stakeholders, including the World Health Organization's prequalification team, national regulatory authorities, manufacturers, procurers, and other experts.

**C** We worked with a broad set of stakeholders, they include the World Health Organization's prequalification team, national regulatory authorities, manufacturers, procurers, and other experts.

**D** We worked with a broad set of stakeholders, who are the World Health Organization's prequalification team, national regulatory authorities, manufacturers, procurers, and other experts.

***Question 9 (1 point)***

Which sentence contains the correct relative clause?

**A** The data, summarized in Fig 2, shows that the time between first regulatory authority submission for a given drug or vaccine to its registration in the last (by disease burden) of 20 Sub- Saharan Africa countries was typically between 4 and 7 years.

**B** The data, summarized in Fig 2 shows that the time between first regulatory authority submission for a given drug or vaccine to its registration in the last (by disease burden) of 20 Sub- Saharan Africa countries was typically between 4 and 7 years.

**C** The data summarized in Fig 2, shows that the time between first regulatory authority submission for a given drug or vaccine to its registration in the last (by disease burden) of 20 Sub- Saharan Africa countries was typically between 4 and 7 years.

**D** The data, where are summarized in Fig 2, shows that the time between first regulatory authority submission for a given drug or vaccine to its registration in the last (by disease burden) of 20 Sub- Saharan Africa countries was typically between 4 and 7 years.

### *Question 10 (1 point)*

Which sentence contains the correct relative clause?

**A** Two of the three typical registration steps products undergo before delivery in the countries involve lengthy timelines.

**B** Two of the three typical registration steps which products are undergo before delivery in the countries involve lengthy timelines.

**C** Two of the three typical registration steps which do products undergo before delivery in the countries involve lengthy timelines.

**D** Two of the three typical registration steps which products undergo before delivery in the countries involve lengthy timelines.

### **Discussion: Connecting Sentences**

Select an article from your field to serve as a model. Alternatively, use one of the articles introduced in this course. Find one example each for as many of the following different clause or sentence types listed here:

– complex sentence with the independent clause at the beginning;
– complex sentence with the dependent clause at the beginning;
– compound sentence using a coordinating conjunction;
– sentence (or pair of sentences) with a sentence connector;
– sentence with a non-restrictive relative clause;
– sentence with a restrictive relative clause.

Discuss answers from at least two other participants. Reply with your ideas on whether or not their examples illustrate the type of clause or sentence labeled.

**Lesson 2: Building Paragraphs**

The way you organize the information within paragraphs is central to a successful paper describing your science research. You want the reader to be able to quickly access the information with full understanding. To do this, you need to place sentences in a very logical order and pay careful attention to how one sentence "flows" into the next. Here are some questions to think about:

– What are the characteristics of a well-written paragraph in science writing?

– How long should a paragraph be?

– How do you organize the ideas/sentences within a paragraph?

– What else should you consider when writing or revising a paragraph?

## Part 1: Characteristics of a Well-Written Paragraph

Each paragraph contains one controlling idea, usually one of the following:

– main idea with supporting explanation and details;

– main idea divided into key categories;

– one step in a process.

Every paragraph should be easy for the reader to navigate and understand.

The first sentence of a paragraph is usually a "topic sentence" that introduces the main idea.

The order of sentences must be logical, but this will vary depending on the topic/purpose of the paragraph.

## Part 2: Paragraph Length

Usually, the length of a paragraph is a topic sentence followed by 3-5 sentences but can vary between 1 and 8 sentences (Wallwork, 2011). Each sentence usually has one or two clauses. Avoid including multiple ideas in one sentence unless the results can be easily read.

## Part 3: Organization of Sentences within a Paragraph

Sentences within a paragraph must be carefully organized according to a logical relationship between ideas. Common patterns for doing this in scientific writing include the following:

– moving from general ideas to more specific ideas;

– introducing one theme and then dividing this into subthemes;

– chronological order.

Analyze the following example paragraphs to decide how the information is organized.

*1. What organization pattern best describes this paragraph?*

Reaching populations in need continues to prove challenging as we at the Bill & Melinda Gates Foundation frequently observe working with partners to fulfill our mission. The challenges point to a high degree of complexity in the interplay of stakeholders in the global regulatory and delivery systems. The key stakeholders include global and regional pharmaceutical companies, non-governmental organizations, national medical product regulatory agencies, ministries of health and others who make product utilization recommendations. In particular, regulatory and procurement requirements vary widely between countries, creating a system with many inefficiencies and redundancies, only a few of which have been adequately documented.*

Answer: It moves from a general idea to consecutively more specific ideas.

*2. What organization pattern best describes this paragraph?*

Twenty field teams consisting of one enumerator, one field worker, and one person trained for blood sample collection were equipped with high resolution maps and a handheld GPS receiver (GPSMAP 62s; Garmin International) with preloaded waypoints for 16 randomly selected compounds and cell boundaries. Compounds were eligible for sampling if at least one adult and one child (< 15 y) were permanent residents (defined as sleeping regularly in the structure) and written informed consent was obtained. If a selected compound did not satisfy these criteria, the nearest non-selected inhabited compound was selected as a replacement. Participating individuals in the community survey were screened by axillary thermometer for fever, and those with fever were tested by RDT (HRP-2, Paracheck, Orchid Biomedical Systems) for on-site malaria diagnosis and treatment with artemether-

lumefantrine (AL) (Coartem, Novartis) if RDT positive. Febrile individuals who were RDT negative, pregnant, or below 6 mo of age were accompanied to a local health facility for a full clinical assessment and treatment.*

Answer: Chronological order is used to describe the steps in this part of the data collection.

*3. What organization pattern(s) best describes this paragraph?*

We identified several potential root causes of this time spread. First, as mentioned earlier, large multi-national manufacturers typically did not prioritize early registration and introduction of their novel products into low-income countries. This is due to limited commercial potential in most of those countries. Additionally, varying requirements and legislative frameworks in low-income countries limit the ability of manufacturers to submit a single dossier concurrently to those countries. The enormous resources required to prepare unique submissions for each country and respond to questions from each individual NRA may have exacerbated this spread. As a result, some countries experience long waits before they even receive application dossiers for review.*

Answer: A theme is introduced and then divided into subthemes. In addition, each subtheme moves from general information to more specific information.

## Part 4: Creating Flow Between Sentences in a Paragraph

The reader should be able to move easily from one sentence to the next, without stopping to wonder how the ideas connect. We often refer to this smooth relationship between sentences as "flow," In scientific writing, flow is usually created through the following three techniques (adapted from Swales & Feak, 2012): 1) placement within sentences of "old" and "new" information, 2) use of determiners and demonstratives, and 3) use of sentence connectors. See below for explanations.

**"Old" and "new" information placement within a sentence**
Place a reference to "old" information (which has already been presented in a preceding sentence) before introducing "new" information. This, along with logical organization of ideas, is the best way to create flow.

Examples

Mosquito exposure was monitored in three interventions and **three control clusters**; in each of **the clusters**, four compounds within hotspot boundaries and eight compounds located in the evaluation zone were randomly selected for monitoring.**

Parasite prevalence in the malaria hotspots and in the evaluation zones surrounding the malaria hotspots was determined based on nPCR parasite detection in **three surveys** conducted in March–April (baseline), June– July (8 wk post-intervention), and August– September 2012 (16 wk post-intervention). Each **survey** took approximately 2 wk to complete.**

Mosquito breeding site productivity was assessed in **15 sites** per intervention hotspot ( n = 75 in total). Of the **sites** sampled prior to larviciding, 45% (34/75) were positive, of which 12 had late-stage larvae and/or pupae.**

Malaria **transmission** in the area is seasonal and associated with seasonal rains that typically **peak** between March and June and between October and November. **Transmission intensity** in the study area is generally low… .**

**Determiners and demonstratives**

When appropriate, use demonstrative adjectives "this" or "these" or the determiner "such" to indicate previously mentioned information.

Examples

Mosquito densities are highest in hotspots, and individuals in hotspots may amplify transmission by transmitting malaria parasites to a large number of mosquitoes that fuel transmission to wider areas. **This** amplified transmission can lead to 1.5- to 4-fold increases in the basic reproductive number of malaria parasites.**

We hypothesized that combined malaria control interventions targeted at hotspots could reduce malaria transmission not only inside these hotspots but also in adjacent areas. To test **this**, we identified hotspots of malaria transmission in a low endemic area in the western Kenyan highlands, and conducted a cluster-randomized controlled trial to measure the effect of hotspot-targeted interventions in evaluation zones surrounding malaria hotspots.**

Successful targeting of malaria control efforts to hotspots may therefore be a highly efficient method to reduce malaria transmission in a wider area and achieve community protection by eliminating

transmission in a relatively small geographical area. **Such** targeted interventions are likely to become increasingly important tools in malaria elimination efforts once transmission in an area has decreased but is maintained in hotspots of malaria transmission.**

**Sentence connectors**

If necessary, and only if necessary, add a sentence connector such as "however" or "for example." Use these sparingly: Too many sentence connectors can actually break up the flow.

Examples

Our decision to monitor the incidence of malaria cases passively was based on the low efficiency of active monitoring of infections in low endemic settings, although we acknowledge that PCD leads to a considerable loss in power compared to active case detection. **As a consequence**, our approach will have resulted in an unknown number of malaria episodes that were missed due to health care seeking behavior or other factors.**

There are several possible reasons for the apparent failure to completely eliminate malaria transmission inside hotspots and the undetectable impact in the evaluation zones surrounding targeted hotspots. **First**, it is possible that our interventions did not clear vector populations or prevent human–vector contact inside hotspots to the extent that is required to interrupt local transmission.**

Our trial included a total of ten clusters during a single season and was therefore not powered to detect subtle effects of hotspot-targeted interventions nor designed to detect effects of interventions that become apparent over multiple transmission seasons. **Furthermore,** we saw a higher than expected level of inter-cluster variation.**

This amplified transmission can lead to 1.5- to 4-fold increases in the basic reproductive number of malaria parasites. Successful targeting of malaria control efforts to hotspots may **therefore** be a highly efficient method to reduce malaria transmission in a wider area and achieve community protection by eliminating transmission in a relatively small geographical area.**

*These examples come from the following reading: Ahonkhai, V., Martins, S.F., Portet, A., Lumpkin, M., & Hartman, D. (2016). Speeding access to vaccines and medicines in low- and middle-income countries: A case for change and a framework for optimized product market authorization. *PLoS One 11*(11)*, 1-12. http://dx.doi.org/10.1371/journal.pone.0166515

**These examples come from the following reading: Bousema, T., Stresman, G., Baidjoe, A. Y., Bradley, J., Knight, P., Stone, W. et al. (2016). The impact of hotspot-targeted

interventions on malaria transmission in Rachuonyo South District in the Western Kenyan Highlands: A cluster-randomized controlled trial. *PLoS One 13*(4)*, 1-25. http://dx.doi.org/10.1371/journal.pmed.1001993

**Practice Quiz: Building Paragraphs (Total – 9 points)**
*Question 1 (1 point)*
What organization pattern best describes this paragraph?

There is huge potential for mobile technologies to improve health care and public health service delivery, especially in resource-poor settings. Mobile technologies are ideally suited to surveillance, a fundamental component of health systems critical for measuring the progress of disease control and prevention measures, for appropriate targeting of resources, and for elimination of infectious diseases. (3) Successful surveillance depends on timely and comprehensive gathering of information to assess disease status, determine appropriate control strategies, and monitor their impact.

**A** general to specific
**B** theme divided into subthemes
**C** chronological order

*Question 2 (3 points)*
How is the "old to new" technique for creating flow used in this paragraph?

(1) There is huge potential for mobile technologies to improve health care and public health service delivery, especially in resource-poor settings. (2) Mobile technologies are ideally suited to surveillance, a fundamental component of health systems critical for measuring the progress of disease control and prevention measures, for appropriate targeting of resources, and for elimination of infectious diseases. (3) Successful surveillance depends on timely and comprehensive gathering of information to assess disease status, determine appropriate control strategies, and monitor their impact.

**A** "Mobile technologies" in Sentence 2 is new information.
**B** "Mobile technologies" in Sentence 2 is old information.
**C** "Surveillance" in Sentence 2 is new information.
**D** "Surveillance" in Sentence 2 is old information.
**E** "Surveillance" in Sentence 3 is old information.

*Question 3 (1 point)*
How many "sentence connectors" are used in this paragraph?

There is huge potential for mobile technologies to improve health care and public health service delivery, especially in resource-poor settings. Mobile technologies are ideally suited to surveillance, a fundamental component of health systems critical for measuring the progress of disease control and prevention measures, for appropriate targeting of resources, and for elimination of infectious diseases. Successful surveillance depends on timely and comprehensive gathering of information to assess disease status, determine appropriate control strategies, and monitor their impact.

    **A** none
    **B** one
    **C** two
    **D** three

*Question 4 (1 point)*

What organization pattern best describes this paragraph?

We evaluated case detection capacity of human rabies cases and exposures, timeliness of reporting, and completeness of surveillance according to standard methods. Monthly reports of bite patients submitted by phone (2011–2013) were over 400% higher than reports compiled from paper records (2005–2010) (S4 Table). These differences likely reflect increased recording of bites and PEP administration – which if not available may have led to health workers neglecting to record bites – and increased reporting from local to central levels, as opposed to increased rabies incidence. Paper records were entirely lacking from some regions despite health workers recalling people dying of rabies and bite victims attending clinics. Physical collation of paper records was often delayed for many months or never occurred, and was stated as a major obstacle for restocking of PEP. In contrast, most mobile phone data were submitted promptly, typically within one week, with delays mostly due to heavy workloads and/or limited time, but also occasionally the result of unreliable power, phone loss (6% lost per annum), or user relocation (6% turnover per annum).

    **A** general to specific
    **B** theme divided into subthemes
    **C** chronological order

*Question 5 (1 point)*

How many "sentence connectors" are used in this paragraph?

We evaluated case detection capacity of human rabies cases and exposures, timeliness of reporting, and completeness of surveillance according to standard methods. Monthly reports of bite patients submitted by phone (2011–2013) were over 400% higher than reports compiled from paper records (2005–2010) (S4 Table). These differences likely reflect increased recording of bites and PEP administration – which if not available may have led to health workers neglecting to record bites – and increased reporting from local to central levels, as opposed to increased rabies incidence. Paper records were entirely lacking from some regions despite health workers recalling people dying of rabies and bite victims attending clinics. Physical collation of paper records was often delayed for many months or never occurred, and was stated as a major obstacle for restocking of PEP. In contrast, most mobile phone data were submitted promptly, typically within one week, with delays mostly due to heavy workloads and/or limited time, but also occasionally the result of unreliable power, phone loss (6% lost per annum), or user relocation (6% turnover per annum).

**A** none

**B** one

**C** two

**D** three

*Question 6 (2 points)*

What other words have been used to help create "flow" between sentences?

We evaluated case detection capacity of human rabies cases and exposures, timeliness of reporting, and completeness of surveillance according to standard methods. Monthly reports of bite patients submitted by phone (2011–2013) were over 400% higher than reports compiled from paper records (2005–2010) (S4 Table). These differences likely reflect increased recording of bites and PEP administration – which if not available may have led to health workers neglecting to record bites – and increased reporting from local to central levels, as opposed to increased rabies incidence. Paper records were entirely lacking from some regions despite health workers recalling people dying of rabies and bite victims attending clinics. Physical collation of paper records was often delayed for many months or never occurred, and was stated as a major obstacle for restocking of PEP. In

contrast, most mobile phone data were submitted promptly, typically within one week, with delays mostly due to heavy workloads and/or limited time, but also occasionally the result of unreliable power, phone loss (6% lost per annum), or user relocation (6% turnover per annum).

**A** We

**B** Monthly reports

**C** These differences

**D** Physical collation of paper records

**Discussion: Building Paragraphs**

Select an article from your field to serve as a model. Alternatively, use one of the articles introduced in this course. Do **ONE** of the following:

– Find a paragraph that uses general-to-specific organization..

– Find a paragraph that uses theme-divided-into-subthemes organization.

– Find an example within a paragraph that illustrates using old-to-new placement of information to create flow. Write the sentences and indicate which information is "old" and which information is "new."

– Find an example within a paragraph that illustrates using "this," "these," or "such" to create flow.

– Find an example within a paragraph that illustrates using a sentence connector to create flow.

Make sure to clearly label which item from the list your example illustrates. Read answers from at least two other participants. Reply with your ideas on how well their examples illustrate the type of paragraph stated.

## Module 2: Exit Quiz (Total – 14 points)

The exercises here use examples from the following articles:

Ahonkhai, V., Martins, S.F., Portet, A., Lumpkin, M., & Hartman, D. (2016). Speeding access to vaccines and medicines in low- and middle-income countries: A case for change and a framework for optimized product market authorization. *PLoS One 11*(11)*,* 1-12. http://dx.doi.org/10.1371/journal.pone.0166515

Mtema, Z., Changalucha, J., Cleaveland, S., Elias, M., Ferguson, H. M., Halliday, J. E. B., et al. (2016). Mobile phones as surveillance tools: Implementing and evaluating a large-Scale intersectoral surveillance system for rabies in Tanzania. *PLoS Med 13*(4): 1-12. http://dx.doi.org/10.1371/journal.pmed.1002002

### Question 1 (4 points)

Can you distinguish dependent clauses from independent clauses? Analyze the following sentences (and parts of sentences), ignoring punctuation. Put a check next to items that are independent clauses. There are four. Find and check all of them.

**A** based on the data presented and discussions with key stakeholders

**B** we are, however, confident that these data gaps did not introduce major biases in the analyses, conclusions, and approaches suggested

**C** Regulatory agencies have an obligation to insist on critical international standards

**D** a recurring theme from our partnership

**E** once the development process is complete

**F** international aid agencies which fund the purchase of vaccines and essential medicines

**G** we identified several potential root causes

**H** two of the three typical registration steps which products undergo before delivery in the countries involve lengthy timelines

*Question 2 (1 point)*

Which sentence connector best fills the blank in the paragraph below?

Generally, countries that fully adhere to ICH standards are termed SRAs and they play major roles in global health as the first regulator of almost all novel drugs and most vaccines used in developing countries. _____, a steadily increasing number of generic versions of innovative products is now first registered by non-SRAs, such as the Central Drugs Standard Control Organization of India and the China Food and Drug Administration (CFDA).

**A** in addition

**B** however

**C** furthermore

**D** for instance

**E** instead

**F** for example

**G** therefore

*Question 3 (1 point)*

Which sentence connector best fills the blank in the paragraph below?

This is due to limited commercial potential in most of those countries. _____, varying requirements and legislative

frameworks in low-income countries limit the ability of manufacturers to submit a single dossier concurrently to those countries.

**A** however

**B** for instance

**C** first

**D** additionally

**E** in contrast

**F** therefore

**G** instead

## Question 4 (1 point)

Which sentence contains the correct relative clause?

**A** We propose a series of measures who were developed in close collaboration with key stakeholders..

**B** We propose a series of measures which were developed in close collaboration with key stakeholders.

**C** We propose a series of measures which is developed in close collaboration with key stakeholders.

**D** We propose a series of measures developing in close collaboration with key stakeholders.

## Question 5 (1 point)

Which sentence contains the correct relative clause?

A Implementation of the changes proposed here, some of whom are already underway, will primarily benefit products that participate in PQ.

B Implementation of the changes proposed here, some are already underway, will primarily benefit products that participate in PQ.

C Implementation of the changes proposed here, some of them are already underway, will primarily benefit products that participate in PQ.that participate in PQ.

D Implementation of the changes proposed here, some of which are already underway, will primarily benefit products that participate in PQ.

## Question 6 (1 point)

Which sentence contains the correct relative clause?

**A** These proposed approaches are designed to build upon elements of the existing system, that are working well and avoid those that are not.

**B** These proposed approaches are designed to build upon elements of the existing system that working well and avoid those that are not.

**C** These proposed approaches are designed to build upon elements of the existing system that are working well and avoid those that are not.

**D** These proposed approaches are designed to build upon elements of the existing system they are working well and avoid those that are not.

***Question 7 (1 point)***

What organization pattern best describes this paragraph?

Mobile phones are cheap and ubiquitous, with massive growth globally, especially in sub-Saharan Africa. Mobile-phone–based health applications are proliferating rapidly and there are persuasive reasons why mobile technologies offer such potential. They can be used at low cost to deliver scalable interventions, to tailor and personalize care, and importantly, to support direct communication between frontline workers, programme managers, patients, and communities. In LMICs, phones provide a means of overcoming structural barriers to access and can empower workers in remote, isolated communities where infrastructure and resources are lacking. However, few mobile-phone–based health systems have been implemented across large spatial scales or evaluated in terms of their usability and impact in LMICs, where there is arguably the most to be gained. We describe the implementation and evaluation of a large-scale mobile-phone–based system used in the context of rabies surveillance in southern Tanzania.

**A** general to specific

**B** theme divided into subthemes

**C** chronological order

***Question 8 (1 point)***

How many "sentence connectors" are used in this paragraph?

Mobile phones are cheap and ubiquitous, with massive growth globally, especially in sub-Saharan Africa. Mobile-phone–based health applications are proliferating rapidly and there are persuasive reasons why mobile technologies offer such potential. They can be used at low cost to deliver scalable interventions, to tailor and personalize care, and importantly, to support direct communication between frontline workers, programme managers, patients, and communities. In LMICs, phones provide a means of overcoming structural barriers to access and

can empower workers in remote, isolated communities where infrastructure and resources are lacking. However, few mobile-phone–based health systems have been implemented across large spatial scales or evaluated in terms of their usability and impact in LMICs, where there is arguably the most to be gained. We describe the implementation and evaluation of a large-scale mobile-phone–based system used in the context of rabies surveillance in southern Tanzania.

    **A** none
    **B** one
    **C** two
    **D** three

*Question 9 (3 points)*

How is the "old to new" technique for creating flow used in this paragraph? Check all that apply.

(1) There is huge potential for mobile technologies to improve health care and public health service delivery, especially in resource-poor settings. (2) Mobile technologies are ideally suited to surveillance, a fundamental component of health systems critical for measuring the progress of disease control and prevention measures, for appropriate targeting of resources, and for elimination of infectious diseases. (3) Successful surveillance depends on timely and comprehensive gathering of information to assess disease status, determine appropriate control strategies, and monitor their impact.

    **A** "Mobile technologies" in Sentence 2 is new information.
    **B** "mobile technologies" in Sentence 2 is old information.
    **C** "Surveillance" in Sentence 2 is new information.
    **D** "Surveillance" in Sentence 2 is old information.
    **E** "Surveillance" in Sentence 3 is old information.

**Module 2: Discussion**

Write an original paragraph using the strategies introduced in this module. Imagine that it is just one paragraph in a paper about your research or another topic within your field. Be sure this paragraph focuses clearly on one main idea. Vary the sentence types. Carefully organize these sentences in a logical way, and make sure there is "flow" between sentences by using old-to-new placement of information and, if

appropriate, words such as "this" or "such." Sentence connectors can also be used, but sparingly.

Read two posts by other participants and give your ideas on the organization and "flow" of their paragraphs. What is done well? What could be improved?

## Module 3: Learning Objectives and Activities

### Objectives for Module 3: Conveying Meaning
− Recognize the role of vocabulary choice in scientific writing style.
− Apply strategies for making writing more concise.
− Use Internet tools to explore usage and collocation.

### Lesson 1: Academic Style and Conciseness
Choosing words and phrasing carefully is central to expressing your scientific work clearly and accurately to your readers. There are several strategies you can follow to help guide your decisions.

#### Part 1: Academic Style
The guidelines below (adapted from Swales & Feak, 2012) will help you select more formal and precise vocabulary appropriate for scientific writing.

| Guidelines | Less Formal/Precise | More Formal/Precise (Use of these possibilities depends on context.) |
|---|---|---|
| Avoid vague expressions. | etc.<br>so forth<br>nice<br>good<br>thing | including ...<br>such as ...<br>positive<br>robust<br>idea / item |
| Avoid phrasal verbs (verb plus preposition forms). | look into<br>went down | investigate / explore<br>decreased |
| Avoid informal expressions. | a lot of<br>big<br>little<br>some<br>bunch of<br>stuff | many / much<br>large<br>small<br>several<br>many / much<br>ideas / items |
| Avoid contractions. | It's<br>They'll | it is<br>they will |

|  | Aren't<br>Didn't | are not<br>did not |
|---|---|---|
| Avoid lengthy negative forms. | not much<br>not much<br>not any | few (Few participants ...)<br>little (Little research ...)<br>no (No studies ...) |

### Part 2: Writing Concisely

Scientific writing requires the use of as few words as possible to make your point. Avoid being "wordy" (using too many words). Express exactly what is needed without adding extra words. The guidelines below (adapted from Wallwork, 2011) will help you avoid unnecessary wordiness.

| Guidelines | Wordy | Better |
|---|---|---|
| Delete redundant words. | The research focused attention on the increase of serious and dangerous cases in the month of July. | The research focused on the increase of serious cases in July. |
| Consider replacing nouns with verbs. | Health care workers provided information to the patients of the risks.<br>The decision of the team was to abandon data collection at this site. | Health care workers informed the patients of the risks.<br>The team decided to abandon data collection at this site. |
| Consider using one verb instead of a verb and noun combination. | We did an analysis of two samples.<br>A decrease in temperature occurred. | We analyzed two samples.<br>The temperature decreased. |
| Consider using an adverb to replace multiple words. | On an interesting note, two participants opted for additional treatments.<br>The interventions were added in a gradual way. | Interestingly, two participants opted for additional treatments.<br><br>The interventions were added gradually. |

| Avoid unnecessary introductions and sentence connectors. | In conclusion, it is clear to us that the treatment is effective but has risks. | [Clearly,] the treatment is effective but has risks. (The word in brackets might also be deleted for even more conciseness.) |
|---|---|---|

### Part 3: Additional Advice on Academic Style

Use articles in journals from your field as models for academic style and conciseness. Analyze these for the vocabulary choices of the authors and take notes when you find examples that are particularly relevant to the topics you write about. Develop a "voice" (style) suitable to the writing conventions in your field.

Edit for style and conciseness in later drafts of your paper rather than in the initial drafting stages. If you worry too much about vocabulary choices and conciseness when you first start writing your paper, you may slow your progress or even suffer from "writer's block." Wait until your ideas and organization are in good shape. Then you can turn your attention to editing for style, conciseness, grammar, and punctuation.

### Practice Quiz: Academic Style and Conciseness (Total – 18 points)

*Question 1 (1 point)*
Which vocabulary choice is most academic?
_____ the root cause was the priority.
**A** Determining
**B** Figuring out

*Question 2 (1 point)*
Which vocabulary choice is most academic?
There was _____ evidence to the contrary.
**A** a lot of
**B** much

*Question 3 (1 point)*
Which vocabulary choice is most academic?
_____ studies have collected data using this method.
**A** Hardly any
**B** Few

*Question 4 (1 point)*
Which vocabulary choice is most academic?
Findings _____ support the hypothesis.
**A** did not
**B** didn't
*Question 5 (1 point)*
Which vocabulary choice is most academic?
Outliers were _____.
**A** thrown away
**B** discarded
*Question 6 (1 point)*
Which vocabulary choice is most academic?
The survey question about flexibility provided _____ data.
**A** good
**B** robust
*Question 7 (2 points)*
Which words can be removed to make the sentence as concise as possible?
Two physicians make use of this service.
**A** Two
**B** physicians
**C** make
**D** use
**E** of
**F** this
**G** service
**Question 8 (3 points)**
Which words can be removed to make the sentence as concise as possible?
Most of the samples that were collected came from a clinic located in Libreville.
**A** Most of
**B** of the
**C** that were collected
**D** came from
**E** located

**F** in Libreville

*Question 9 (3 points)*

Which words can be removed to make the sentence as concise as possible?

In general, it has been shown that the results obtained were significant.

**A** In general,
**B** it has been shown that
**C** the results
**D** obtained
**E** were significant

*Question 10 (4 points)*

Which words can be removed to make the sentence as concise as possible?

Several studies in the past and also more recently have focused on the use of this treatment.

**A** Several studies
**B** in the past
**C** and also
**D** more recently
**E** have focused on
**F** the use of
**G** this treatment

**Discussion: Academic Style and Conciseness**

Write 3-5 (or more if you wish) sentences describing your scientific work or a topic from your science field. Edit these carefully for academic style and conciseness. Read posts from at least two other participants. Provide your ideas (using terms and ideas from this lesson) on how their sentences succeed at style and conciseness. If you notice areas for improvement, make suggestions based on the guidelines from this lesson.

**Lesson 2: Vocabulary Choices in Scientific Writing**
**Part 1: Distinguishing between Active and Passive Vocabulary**

It is estimated that most language users have an active vocabulary of roughly 15,000 to 20,000 words, although the 1,000 most frequently used words make up approximately 90% of most written work.

**Active vocabulary** refers to words that an individual can actively recall and use appropriately in language production (speech and writing).

**Passive vocabulary** refers to words that an individual can recognize and understand in language reception (listening and reading) only.

**Part 2: Academic and Scientific Vocabulary**

Academic vocabulary can be divided into two types:

**Technical academic vocabulary** is words that are unique to certain academic disciplines. These are specialized terms, and they are generally only learned and used by students and researchers within that discipline.

**General academic vocabulary** is words that are used across disciplines for a broad range of academic writing purposes. Vocabulary of analysis or vocabulary related to the research process are examples of general academic vocabulary.

**Part 3: Academic Word Lists and Phrasebanks**

The **Academic Word Lists (AWL,** http://www.victoria.ac.nz/lals/resources/academicwordlist) was created from general academic vocabulary and contains 570 word families and over 2000 words in total (Coxhead, 2000). This word list is based on a corpus of over 3.5 million words drawn from academic books and journals in a wide range of disciplines.

The **Academic Phrasebank** (http://www.phrasebank.manchester.ac.uk/), developed by the University of Manchester, can also be a useful resource for scientific writing. For example, by clicking the link to "explaining causality," we are presented with nouns, verbs, prepositions, and connectors used frequently to show causality.

### Part 4: English Language Corpora

A language corpus (plural corpora) is a large collection of texts that have been collected and organized for the purposes of linguistic research. Corpora exist for both written and spoken speech and for general as well as academic English.

Several commonly used corpora are listed below along with features of each:

| Title | Word Count | Time Period | Features and Sources |
|---|---|---|---|
| NOW (News on the Web) Corpus | 2.8 billion | 2010-present | Online newspapers and magazines<br>Updates daily as new sources go online |
| COCA (Corpus of Contemporary American English) | 520 million | 1990-2015 | Balanced academic and general<br>Balanced written and spoken<br>American English focus |
| BNC (British National Corpus) | 100 million | 1980-1993 | Balanced written and spoken<br>British English focus |
| TIME Magazine Corpus | 100 million | 1923-2006 | From 275,000 articles written in TIME Magazine |

### Part 5: Using COCA (Corpus of Contemporary American English)

The **Corpus of Contemporary American English (COCA,** http://corpus.byu.edu/coca/) was developed by Brigham Young University and is frequently used by linguists and researchers from many academic disciplines.

Learning to search COCA is not hard. After you go to the site, you can simply type terms into the search box to find results. It is helpful to click on the "sections" button below the search box because then you are able to customize your search. For example, you can specify that the

search will occur only for spoken words, fiction, academic writing, newspapers, or a variety of other options.

You can also use the "insert POS" (POS stands for Part of Speech) button to ask COCA to search for only certain parts of speech for a word. Try an example yourself. Type a term such as "research" into the search box. Using the "insert POS" drop-down menu, you can add "verb.all." If you complete this search, COCA will return only examples where the word "research" is used as a verb. Many other options such as "verb.ED" and "verb.[DO]" exist as well, so you need to experiment to customize your search exactly the way you want.

Another interesting feature of COCA is that after completing a search, you are presented with an entire list showing the full range of words that appear next to your search term. Importantly, each entry is clickable as well, giving you a complete list of the exact sentences containing this combination of words. Information such as this can be invaluable for academic writers struggling to find appropriate words or phrasing in their writing.

### Part 6: Using Google Search

Although not as customizable as COCA, Google ([www.google.com](www.google.com)) search can help as well, particularly if you use quotation marks and asterisks in your searches.

| Use quotes "   " | Find only the exact phrase you enter: "research indicates" |
|---|---|
| Use asterisk * | Use an asterisk to find an unknown word: "a * amount of research" |

In the above example using the asterisk, results will reveal common words that come before "amount of research." Browsing through search results reveals phrases such as "a significant amount of research" with 391,000 results and "a vast amount of research" with 317,000 results.

Again, information such as this can assist scientific and academic writers in many ways.

**Practice Quiz: Vocabulary Choices in Scientific Writing (Total – 7 points)**

*Question 1 (1 point)*

What is the definition of a "corpus"?

**A** all the words in English that a Google search can find

**B** a large collection of texts that have been organized for linguistic or academic research

**C** a vocabulary list in languages other than English that you can use for translation

**D** a collection of academic and scientific vocabulary that all native speakers of English know

*Question 2 (1 point)*

A language user's active vocabulary refers to the words that he or she can actively recall and use appropriately in language production (speech and writing).

**A** True

**B** False

*Question 3 (1 point)*

Which of the following corpora allows you to search newspapers and magazines from less than one month ago?

**A** BNC (British National Corpus)

**B** TIME Magazine Corpus

**C** COCA (Corpus of Contemporary American English)

**D** NOW (News on the Web) Corpus

*Question 4 (1 point)*

When you choose "sections" in COCA, you are able to choose from

**A** specific types of corpora such as spoken, fiction, or academic

**B** different grammatical sections such as verbs, nouns, or pronouns

**C** different time ranges such as 1950-1960

**D** various websites with information on corpora

*Question 5 (1 point)*

Using a semicolon (" ; ") when searching on Google will give you a blank or wildcard search.

**A** True

**B** False

*Question 6 (1 point)*
If you want to find an exact phrase or sentence using Google, you need to put that word or phrase in quotation marks.
**A** True
**B** False

*Question 7 (1 point)*
Words specifically related to data analysis such as "qualitative research" or "linear regression" are often called
**A** technical academic vocabulary
**B** general academic vocabulary
**C** research vocabulary
**D** corpus vocabulary

**Discussion: Vocabulary Choices in Scientific Writing**
Review the Academic Phrasebank (http://www.phrasebank.manchester.ac.uk/) website created by the University of Manchester.

Click on several of the links on the left side of the site. For example, you might look at "describing trends" or "describing quantities." List at least FIVE phrases that are new to you that you think would be useful to incorporate in your academic and scientific writing and list the category they belong to (i.e. Classifying and Listing, Being Critical, Describing Trends, Describing Quantities etc.).

Also, answer the following questions: Do you feel sites like this are helpful in the development of scientific or academic writing? Do you have other sites that you have found helpful as well? Feel free to share your resources with the group here.

**Module 3: Exit Quiz (Total – 14 points)**
*Question 1 (1 point)*
Which vocabulary choice is most academic?
Findings _____ support the hypothesis.
**A** did not
**B** didn't

*Question 2 (1 point)*
Which vocabulary choice is most academic?
Outliers were _____.

**A** discarded

**B** thrown away

*Question 3 (1 point)*

Which vocabulary choice is most academic?

The survey included _____ open-ended questions.

**A** three

**B** a few

*Question 4 (1 point)*

Which vocabulary choice is most academic?

The researchers had to _____ a back-up plan due to climate problems at the site.

**A** figure out

**B** determine

*Question 5 (1 point)*

Which vocabulary choice is most academic?

_____ studies address these issues.

**A** Hardly any

**B** Few

*Question 6 (4 points)*

Which words can be removed to make the sentence as concise as possible? Check all that apply.

As we have already noted, folk remedies and also myths created by people about this disease were explored through survey questions and interview questions.

**A** we have already

**B** also

**C** created by people

**D** about this disease

**E** were explored

**F** through survey

**G** questions

**H** interview questions

*Question 7 (1 point)*

Which of the following is the best definition of a language corpus?

**A** a large collection of written or spoken texts used for linguistic research

**B** many books put together in one place for researchers to use

**C** recordings of video and audio materials for academic research

**D** an online teaching resource containing at least 520 million words

*Question 8 (1 point)*

How can using an online corpus such as COCA help with your scientific writing?

**A** COCA has online tutors available to give you feedback on your writing.

**B** COCA can show common ways to use scientific vocabulary in academic writing.

**C** COCA can be used to help you search for specific journal articles.

**D** COCA is not designed to help you with your scientific writing.

*Question 9 (1 point)*

When using a Google search, what is the purpose of the asterisk (" * ") symbol?

**A** You cannot use the asterisk symbol in a Google search.

**B** The asterisk symbol limits your search to only academic sources.

**C** The asterisk symbol acts as a blank space when conducting a search.

**D** Using the asterisk symbol will return only exact phrase matches in a Google search.

*Question 10 (1 point)*

A language user's passive vocabulary is generally smaller than his/her active vocabulary.

**A** True

**B** False

*Question 11 (1 point)*

Words like "qualitative" and "quantitative" refer to academic research methods. These types of words are part of general academic vocabulary.

**A** True

**B** False

**Module 3: Discussion**

What is your field of science? What are 15-20 English words or phrases that are particularly useful for writing about your field?

Find a post written by a participant from the same (or similar) field as you. Identify three words/phrases from his/her list that you never or rarely use in your own writing but that look interesting to you. Use COCA or another corpus to explore these words/phrases. Then, write a sample sentence for each of the three words/phrases. These can come from the corpus or you may create your own sample sentences. Be sure to indicate where you found the sentences or if you wrote them yourself.

## Module 4: Learning Objectives and Activities

**Objectives for Module 4: Quoting, Paraphrasing, and Avoiding Plagiarism**
– Differentiate between quoting, paraphrasing, and summarizing.
– Develop skills to avoid unintentional plagiarism.
– Determine when citation is needed.
– Paraphrase and quote information from outside sources.
– Develop awareness of different citation formats (MLA, APA, CMS).

**Lesson 1: Quoting, Paraphrasing, and Avoiding Plagiarism**

**Part 1: Quoting, Paraphrasing, and Summarizing: How Are They Different?**
**Quoting** requires taking a sentence or short passage from an original source and copying it into your own writing using quotation marks.
**Paraphrasing** involves using a passage from a reading and putting it into your own words. Paraphrasing generally condenses the original material slightly.
**Summarizing** is taking the main ideas of an extended reading and expressing them in your own words. Summaries are shorter than source material and give a broad overview.
The table below summarizes the primary differences between quoting, paraphrasing, and summarizing:

|  | **Requires Citation** | **Wording** | **Additional Information** |
|---|---|---|---|
| Quote | yes | Author's words | Quotation marks are required. |
| Paraphrase | yes | your own words | Be sure to use your own language to avoid plagiarism. |
| Summary | yes | your own words | Be as clear and concise as possible. |

| | | | This generally applies to a long passage. |
|---|---|---|---|
| | | | |

Consider the following text. How would you quote or paraphrase this information?

Mobile phones are cheap and ubiquitous, with massive growth globally, especially in sub-Saharan Africa. Mobile-phone–based health applications are proliferating rapidly and there are persuasive reasons why mobile technologies offer such potential.*

Quote sample

Mobile phones have many potential applications beyond basic communication, and one of these can be found in the health sector. For example, in Tanzania today, "mobile-phone–based health applications are proliferating rapidly" (Mtema et al., 2016).

Paraphrase sample

In Tanzania and other sub-Saharan African countries, cell phones are frequently being used to track health-related data (Mtema et al., 2016).

## Part 2: Avoiding Plagiarism in Your Writing

Plagiarism can be both intentional and unintentional and can happen in many forms including full papers, paragraphs, sentences, or ideas. Plagiarism can also occur when using spoken words, statistics and numbers, emails, websites, or many other sources. When you plagiarize, you

– use someone else's words or ideas without proper citation, and/or
– represent the words or ideas of others as your own.

You can avoid plagiarism by keeping careful track of all materials you read and review as you research. When you choose to include information from an outside source, follow the suggestions for quoting and paraphrasing above, and be careful to always include full citation information for each source.

* This example comes from the following reading: Mtema, Z., Changalucha, J., Cleaveland, S., Elias, M., Ferguson, H. M., Halliday, J. E. B., et al. (2016). Mobile phones as surveillance tools: Implementing and evaluating a large-scale intersectoral surveillance system for rabies in Tanzania. *PLoS Med 13*(4): 1-12. http://dx.doi.org/10.1371/journal.pmed.1002002

**Practice Quiz: Quoting, Paraphrasing, and Avoiding Plagiarism (Total – 7 points)**

*Question 1 (1 point)*

When paraphrasing, you should be sure to use the author's exact words as much as possible.

**A** True

**B** False

*Question 2 (1 point)*

Quotations marks should be used when quoting and when paraphrasing.

**A** True

**B** False

*Question 3 (1 point)*

When choosing between quoting, paraphrasing, and summarizing, it is best to

**A** Quote as little as possible. You should focus on summarizing or using your own words as much as you can.

**B** Quote as much as possible. You want to show your readers you've reviewed many sources.

**C** Paraphrase as much as possible to show readers your ability to paraphrase.

**D** Do whatever works best for you. There are no guidelines for choosing between these options.

*Question 4 (1 point)*

Paraphrasing generally condenses the original material that is being cited.

**A** True

**B** False

*Question 5 (1 point)*

Which of the following sources need to be cited when used in your writing?

**A** all of the sources below

**B** written works from others

**C** lectures given by others

**D** emails you have received from others

*Question 6 (1 point)*

Is it still plagiarism if you accidentally include ideas from an outside source even if you didn't intend to?

**A** Yes, this is still considered to be plagiarism.

**B** No, if you do it accidentally, it is not plagiarism.

**C** It depends. Some universities call this plagiarism and some do not.

**D** Usually not. The most important factor in determining plagiarism is intent.

### Question 7 (1 point)

Which of the following are strategies for successful paraphrasing? Choose all that apply.

**A** Make sure you fully understand the meaning of the original passage.

**B** Adapt linking phrases and verbs to re-arrange key parts of the sentence.

**C** Change key vocabulary and phrases.

**D** Use no more than 5 words consecutively from the original material.

## Discussion: Quoting, Paraphrasing, and Avoiding Plagiarism

1. Look at the following quote taken from one of our course readings:

"We have demonstrated the considerable value and feasibility for mobile technologies to improve health systems."*

2. Paraphrase this quote in your own words by rewriting it as one or two complete sentences. Use the paraphrasing tips discussed in the video and lesson to guide you.

3. When you respond to others, give your ideas on the paraphrase they have chosen. Think about word choice, consistent meaning, and the structure of the sentence in the paraphrase.

*This example comes from the following reading: Mtema, Z., Changalucha, J., Cleaveland, S., Elias, M., Ferguson, H. M., Halliday, J. E. B., et al. (2016). Mobile phones as surveillance tools: Implementing and evaluating a large-scale intersectoral surveillance system for rabies in Tanzania. *PLoS Med 13*(4): 1-12. http://dx.doi.org/10.1371/journal.pmed.1002002

**Lesson 2: References and Citation Formats**

**Part 1: Key Terms Related to References and Citation Formats**

Before reading further, review these key terms to make sure you understand the language used in this module:

– References – alphabetical list of all sources cited in a piece of writing (used for APA format)

– Work cited – alphabetical list of all sources cited in a piece of writing (used for MLA format)

– Bibliography – list of all materials reviewed and consulted while preparing to write

– Annotated references – list of references that includes a brief summary of the content of each

– End notes – notes providing reference or other information placed at the end of the text (common in CMS format)

– Footnotes – notes providing reference or other information placed at the bottom of the page (common in CMS format)

**Part 2: Citation Formats**

Different journals and academic disciplines use slightly different citation formats. Let's look at some of the most common here.

| Abbreviation | Full Name | Disciplines Used | Characteristics |
|---|---|---|---|
| APA | American Psychological Association | social sciences | "References" page used at the end emphasizes publication date |
| MLA | Modern Language Association | humanities | "Work Cited" page used at the end emphasizes author's name |
| CMS | Chicago Manual of Style | history | allows for use of end notes and footnotes |
| NLM | National Library | medicine | similar to MLA |

| | | |
|---|---|---|
| | of Medicine | PLOS ONE | |

Differences in these formats are often small both for in-text and end-of-text citations. The table below provides samples of each for citing an academic journal. The specific formats for journal articles, books, websites, and all other material can be found in the appropriate style guides and various online resources listed in this week's supplemental materials.

| | **In-text Citation Example** | **End-of-text Citation Example** |
|---|---|---|
| APA | (Reinhardt & Zander, 2011) | Reinhardt, J., & Zander, V. (2011). Social networking in an intensive English program classroom: A language socialization perspective. *CALICO Journal, 28*(2), 326-344. |
| MLA | (Reinhardt & Zander, 2011) | Reinhardt, Jonathon, and Victoria Zander. "Social Networking in an Intensive English Program Classroom: A Language Socialization Perspective." *CALICO Journal*, vol. 28, no. 2, 2011, pp. 326–344. |
| CMS | *Footnote | Reinhardt, Jonathon, and Victoria Zander. "Social Networking in an Intensive English Program Classroom: A Language Socialization Perspective." *CALICO Journal* 28, no. 2 (2011): 326-44. |
| NLM | (Reinhardt & Zander, 2011) | Reinhardt J, Zander V. Social Networking in an Intensive English Program Classroom: A Language Socialization Perspective. CALICO Journal. 2011;28(2):326–44. |

### Part 3: Use of Online "Citation Machines"

There are a variety of sites online designed to automate the citation process. A website called **Citation Machine** (http://www.citationmachine.net/) is very popular. Sites like these often work well and save time. You can enter or simply search for a journal

article or book, and once the site finds the reference, it will automatically generate the citation in the format you choose. However, remember to check all information carefully yourself. These sites are not perfect, and mistakes often occur.

### Part 4: Reference Management Tools

Reference management tools can be a great way for academics to manage large reference libraries. Many of these tools will keep track of all of your online and offline references, automatically generate reference pages for publication, and allow you to share your reference libraries with others. Four of the most common reference management tools are listed here. Be aware that each reference management tool has advantages and disadvantages. Study the features (paid and free) of each carefully before making a decision about which to use.

**Zotero** (https://www.zotero.org/) – Completely free and usable by all. Some universities have licenses offering additional features.

**Mendeley** (https://www.mendeley.com/) – Completely free and usable by all.

**End Note** (http://endnote.com/) – Paid service with different prices for students and faculty. Some universities have licenses available.

**RefWorks** (https://refworks.proquest.com/) – Paid service (currently 100 USD).

The University of Toronto offers a nice **comparison chart** (http://guides.library.utoronto.ca/c.php?g=250610&p=1671260) of the different features and prices of these four reference management tools.

**Practice Quiz: References and Citation Formats (Total – 6 points)**

*Question 1 (1 point)*
When you annotate references, it means you are providing both a footnote and an endnote for each reference.
**A** True
**B** False
*Question 2 (1 point)*

The terms "works cited" and "references" often mean the same thing, but they are used differently depending on which citation format (MLA, APA, etc.) you are using.

**A** True

**B** False

***Question 3 (1 point)***

Which citation format suggests the use of endnotes and footnotes for references?

**A** American Psychological Association (APA)

**B** The Chicago Manual of Style (CMS)

**C** Modern Language Association (MLA)

**D** National Library of Medicine (NLM)

***Question 4 (1 point)***

Look at the following citation. Which citation format is being used?

Jacoby, W. G. (1994). Public attitudes toward government spending. *American Journal of Political Science*, *38*(2), 336-361.

**A** NLM

**B** MLA

**C** APA

**D** CMS

***Question 5 (1 point)***

Which of the following statements is true about the use of online citation machines?

**A** Online citation machines can be very helpful, but you need to check them carefully to make sure no errors have occurred.

**B** Online citation machines should not be used for academic writing.

**C** Online citation machines are always accurate and correct.

**D** Online citation machines only work for APA format.

***Question 6 (1 point)***

Which of the following reference management tools is the best for scientific writing?

**A** Zotero

**B** RefWorks

**C** Mendeley

**D** They are all good possibilities for scientific writing.

**Discussion: References and Citation Formats**

1. Choose one of the following 4 reference management tools to write about in this discussion:

– Zotero

– RefWorks

– Mendeley

– Endnote

2. If you have experience using one of these tools, share your experience. What features does the tool have? What did you like and dislike about it?

3. If you have no experience with any of these tools, choose one and do some research. Look at the website for your tool and read some reviews online. What is your impression of this tool? How could it help you in your research and work?

**Module 4: Exit Quiz (Total – 10 points)**

*Question 1 (1 point)*

Is it still plagiarism if you accidentally include ideas from an outside source even if you didn't intend to?

**A** Yes, even unintentional plagiarism is still always considered plagiarism.

**B** No, if you do it accidentally, it is not plagiarism.

**C** It depends. Some universities call this plagiarism and some do not.

**D** Usually not. The most important factor in determining plagiarism is intent.

*Question 2 (1 point)*

Which of the following are strategies for successful paraphrasing? Choose all that apply.

**A** Make sure you fully understand the meaning of the original passage.

**B** Adapt linking phrases and verbs to rearrange key parts of the sentence.

**C** Change key vocabulary and phrases.

**D** Use no more than 5 words consecutively from the original material.

*Question 3 (1 point)*
When you annotate references, it means you are providing both a footnote and an endnote for each reference.
**A** True
**B** False

*Question 4 (1 point)*
Which citation format suggests the use of end notes and footnotes for references?
**A** American Psychological Association (APA)
**B** Chicago Manual of Style (CMS)
**C** Modern Language Association (MLA)
**D** National Library of Medicine (NLM)

*Question 5 (1 point)*
Look at the following citation. Which citation format is being used?
Jacoby, W. G. (1994). Public attitudes toward government spending. *American Journal of Political Science*, *38*(2), 336-361.
**A** NLM
**B** MLA
**C** APA
**D** CMS

*Question 6 (1 point)*
Which of the following statements is true about the use of online citation machines?
**A** Online citation machines can be very helpful, but you need to check them carefully to make sure no errors have occurred.
**B** Online citation machines should not be used for academic writing.
**C** Online citation machines are always accurate and correct.
**D** Online citation machines only work for APA format.

*Question 7 (1 point)*
If you are not sure which citation format should be used, it is best to write using APA format.
**A** True
**B** False

*Question 8 (1 point)*
Read the following quote and choose the best paraphrase.

"In low and middle income countries, phones provide a means of overcoming structural barriers to access and can empower workers in remote, isolated communities where infrastructure and resources are lacking" (Mtema et al., 2016).

**A** In low and middle income countries, many people are using phones to overcome structural barriers to access in remote areas (Mtema et al., 2016).

**B** People in many developing countries are able to use cell phones to get beyond challenges such as limited resources and being cut off from urban centers (Mtema et al., 2016).

**C** People in many developing countries are able to use cell phones to get beyond challenges such as limited resources and being cut off from urban centers.

**D** Cell phones are great tools for social interaction and they are being used in many low and middle income countries (Mtema et al., 2016).

*Question 9 (1 point)*
In academic writing, sources generally need to be cited
**A** both within the text and at the end of the text as well
**B** only within the text
**C** only at the end of the text
**D** wherever the author decides is the best place for the citation

*Question 10 (1 point)*
When quoting another author in your writing, it is essential to use quotation marks because they
**A** make your writing appear more academic
**B** help to break up longer sentences in your writing
**C** are a stylistic guideline that are generally good to use
**D** show the reader exactly which words are yours and which are not

**Module 4: Discussion – Plagiarism in Your Country or Region**
Different countries and regions around the world have different ideas about plagiarism. In this course, we have presented you with guidelines for the United States and for general academic publication.

1) How is plagiarism defined and dealt with in your own country or region of the world?

2) How much of a problem do you consider plagiarism to be in your culture, and what kinds of plagiarism are most common?

3) How is plagiarism dealt with at the post-secondary level? What kinds of measures does the institution take to prevent it and deal with it if it occurs?

# Reference

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Swales, J., & Feak, C. (2012). *Academic writing for graduate students: Essential skills and tasks* (3rd ed.). Ann Arbor, MI: The University of Michigan Press.

Wallwork, A. (2016). *English for writing research papers*. New York: Springer.

# Appendix: Additional Resources

The following are additional resources you can explore to learn more about the topics from each module.

**Module 1**

*General Grammar Sites*

1) Purdue Online Writing Lab Grammar: https://owl.english.purdue.edu/exercises/32/

2) British Council Grammar: https://learnenglish.britishcouncil.org/en/english-grammar

3) 5-Minute English: http://www.5minuteenglish.com/

4) Activities for ESL Students: http://a4esl.org/

5) Laurie's ESL Grammar Activities: https://fog.ccsf.edu/~lfried/grammar/grammar.html

6) Using English for Academic Purposes: http://www.uefap.com/grammar/gramfram.htm

7) Grammar Book: http://www.grammarbook.com/ (scroll down to the collection of free grammar guides and quizzes)

*Practice Activity Sites*

8) Adjective Order: http://a4esl.org/q/h/vm/adjorder.html

9) Tenses: http://www.englishtenses.com

**Module 2**

1) Independent and dependent clauses: https://owl.english.purdue.edu/owl/resource/598/01/

2) Relative clauses: https://owl.english.purdue.edu/owl/resource/645/01/
and http://writingcenter.unc.edu/handouts/relative-clauses/

3) Punctuation: http://advice.writing.utoronto.ca/revising/

4) Semi-colon and colon quiz: http://www.grammarbook.com/grammar_quiz/semicolons_and_colons_1.asp

5) Paragraphs and punctuation: http://www.uefap.com/writing/writfram.htm

6) Writing paragraphs: https://owl.english.purdue.edu/owl/resource/606/01/

7) Paragraphs in scientific writing:
http://www.monash.edu.au/lls/llonline/writing/science/paragraphs/index.xml

8) Cohesion in scientific writing:
https://cgi.duke.edu/web/sciwriting/ (see Lesson II)

**Module 3**

1)                How                to                Use                COCA
(https://www.youtube.com/watch?v=sCLgRTlxG0Y). The video gives a good overview of how to use COCA as a tool for linguistic research.

2)                        Google                        Dictionary
(https://chrome.google.com/webstore/detail/google-dictionary-by-goog/mgijmajocgfcbeboacabfgobmjgjcoja?hl=en). If you use the Chrome web browser, this extension allows you to immediately see the definition of any word, just by putting your mouse over the word.

3)                Developing                Vocabulary                Skills
(http://www.uefap.com/vocab/vocfram.htm). This site provides an overview of vocabulary usage in EAP (English for Academic Purposes) contexts.

4)                                                Conciseness
(https://owl.english.purdue.edu/owl/resource/572/01/). The Purdue Online Writing Lab (OWL) offers a variety of tips and advice for making sure you are concise and direct in your academic writing.

5)        Vocabulary        Choices        in        Scientific        Writing
(https://cgi.duke.edu/web/sciwriting/). (See Lesson 1 for nominalizations. See Lesson 3 for conciseness.)

**Module 4:**

1) Purdue Online Writing Lab: Research and Citations (https://owl.english.purdue.edu/owl/section/2/): This link will give you an excellent source of information on many of your basic questions about citation formats and academic style and formatting in general.

2)                UEFAP:                Avoiding                Plagiarism
(http://www.uefap.com/writing/writfram.htm): Here you can learn some suggestions and tips on how to avoid plagiarism in your own writing.

3)        Academic        Integrity        at        MIT:        Avoiding        Plagiarism
(https://integrity.mit.edu/handbook/academic-writing/incorporating-

words-and-ideas-others): This site from MIT also discusses the avoidance of plagiarism.

4) Academic Integrity at MIT: Quoting and Paraphrasing (https://integrity.mit.edu/handbook/academic-writing/avoiding-plagiarism-choosing-whether-quote-or-paraphrase): You can look here if you have specific questions about the differences between quoting and paraphrasing in your writing.

5) Citation Machine (http://www.citationmachine.net/): This site allows you to easily generate academic citations in a wide range of formats from books, journal articles, and websites.